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THE SILVER INSTITUTE LETTER

INFORMATION ON SILVER FOR INDUSTRY

VOLUME XI, NUMBER 2 FEBRUARY, 1981

NEW MOTION PICTURE "SILVER" PRESENTED BY THE SILVER INSTITUTE

The exciting new version of the color sound film **"Silver"** was seen for the first time at the Board Meeting of The Silver Institute, held in Washington, D.C. on February 2nd. This film, which gives the viewer a unique opportunity to accompany silver from its ancient veins deep within the earth, through its complicated processing and on to its many, many beneficial uses, was paid for by the members of the Silver Institute which will give 300 prints to the Bureau of Mines for circulation on a free-loan basis to educational institutions, civic and business groups, scientific and professional societies and other responsible organizations.

Attending the Silver Institute Board Meeting in Washington, D.C. are (l. to r.) Institute Chairman, Charles D. Snead, Jr. of Callahan Mining Corp., Institute Vice President Harry M. Conger of Homestake Mining Co., Paul Henshaw of Homestake Mining Co., William A. Griffith of Hecla Mining Co., W.C. Cole of Earth Resources Co., Justin L. Rice of Coeur d'Alene Mines Corp. and Robert Valentino of AMAX Lead and Zinc, Inc.

Watching the miners—using the most modern of safety and mining equipment—working a mile below the earth's surface and hearing the words, "They know the beauty of the metal they mine . . . and of its vital role in the modern world," and "Today, silver is harder to find . . . costlier to mine." sets the mood for this industrial adventure . . . Animated drawings of an underground lead-silver mine . . . Dramatic pictures of the labors of crushers, flotation cells, concentrate drying and an open-pit mine. More drawings explain the smelting procedure. Impressionistic film of pouring silver, silver ingots, silver foil and silver wire accompany descriptive words to a background of music and industrial sounds. Then the beauty of the silversmith and the words, "Grace . . .Purity . . . Elegance . . . Silver . . . Incomparable silver . . ." Batteries, mirrors, better water, polyester fabrics, automobile starters, X-ray film, motion pictures such as "Silver", still photography, solar energy—so many wonderful products from silver that the viewer is not surprised when the narrator says, "From the moment we rise to the time we go to bed, we use silver alloys throughout the whole wide world of modern day life . . ."

Because of the international character of both the precious metal, silver, and The Silver Institute's membership, the "Silver" motion picture will be available in the future with Spanish, German, French and Japanese soundtracks, in addition to the original English language version. When a portion of the Spanish language version was shown, Carlos Loret de Mola of Compañia Minera Huampar, S.A. of Peru enthusiastically commented, "Unico en su genero! Este excelente film revela los procesos de producción y los multiples usos de la plata . . .", and a view of the German version sparked this comment by John W. Eschenlohr of Degussa of West Germany, "Dieser interessante film zeigt in leicht verstandlicher form die Forderung, das Scheiden und die mannigfaltigen Anwendungen von Silber im Alltag."

In April, in the U.S., requests for the loan of English version prints of "Silver" should be addressed to Motion Pictures, Bureau of Mines, U.S. Department of Interior, 4800 Forbes Avenue, Pittsburgh, Pennsylvania 15213. Information regarding the availability of "Silver" through Silver Institute members in other countries will be announced at a later date.

***Below (l. to r.):** Ricardo Rojo of Industrias Peñoles, S.A., Institute Chairman Emeritus, Simon D. Strauss of ASARCO, Inc., Carlos Loret de Mola of Cia. Minera Huampar, S.A. and Robert M. Reininger of Rosario Resources discuss the Spanish language version of the motion picture "Silver".*

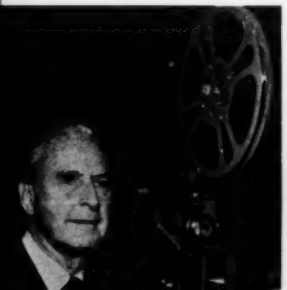
SILVER INSTITUTE BEGINS SECOND DECADE OF SERVICE

Left to right: Institute Treasurer William P. Lohden of Callahan Mining Corp., A.C. Haskell of Hilemn Laboratories, Sohier D. Marks of Mocatta Metals and Frank G. Woodruff of Gulf Resources and Chemical Co.

Silver Institute Chairman, Charles D. Snead, Jr. of Callahan Mining Corporation, reminded Institute officers and directors attending the February meeting of the Institute's Board of Directors in Washington, D.C., that ten years ago, ten firms demonstrated their faith in the future of the silver industry by creating The Silver Institute which, today, has over 145 corporate members. Mr. Snead noted that just in the past year, the Institute's membership has grown more than 10%, and expressed the confidence that the Institute's service will continue its healthy growth in the next decade. Founding members of The Silver Institute are: AMAX, ASARCO Inc., Anaconda Co., Callahan Mining Corp., Cerro Mines (Centromin Peru), Day Mines, Inc., Hecla Mining Co., Rosario Resources, Sunshine Mining Co. and The Bunker Hill Co.

Following a financial report by Institute Treasurer, William P. Lohden, the Chairman of the Nominating committee and past-President of the Institute, Robert M. Reininger, expressed the Institute's appreciation for "the great contributions to the work of The Silver Institute" made by Henry L. Day of Day Mines, Inc., David J. Wagnon of Sunshine Mining Co., and Ian G. Gould of North Broken Hill Ltd., who, because of change of duties, have resigned from the Board of Directors. Nominated and elected to fill these vacancies were William M. Calhoun of Day Mines, Inc., G. Michael Boswell of Sunshine Mining Co., and Peter C. Barnett of North Broken Hill Ltd. Mr. Barnett was also elected to serve as Vice President of the Silver Institute for Australia and Asia, completing the term of Ian G. Gould.

Institute Executive Director, Richard L. Davies, described some of the current activities of the Institute and presented the premiere showing of the updated film "Silver" to the Board of Directors.



At left: Institute Executive Director, Richard L. Davies, shows "Silver" to the Institute's officers and board members. ***Above, left:*** *the German language version of the film "Silver" is discussed by (l. to r.) Felix Freeman of J. Aron & Co., John W. Eschenlohr of Degussa and Alex Schmidt-Fellner of AMAX Inc.* ***Above, right:*** *Attending the Board Meeting from the United Kingdom are (l. to r.) Michael Hughes of Texasgulf, London, Willem Beunderman of Consolidated Gold Fields Ltd. and Robert Mansell of Engelhard Industries.* ***Below, left (l. to r.):*** *Institute Vice President-Canada, A.M.B. Hart of Johnson Matthey Ltd., J.A.K. McPhail of Inco Metals Co., J.A. Butterfield of Equity Silver Mines and Kent D. Hoffman of Texasgulf, Inc.* ***Below, right (l. to r.):*** *Institute Vice President Bob Ross of Engelhard Industries, Art Mrozek of Sabin Metals Corp., John H. Boyd of Kennecott Sales Corp., Peter Hamilton of Royal Apex Silver, Inc. and James C. Buck of ASARCO, Inc.*

THREE NEW MEMBERS FROM THREE DIFFERENT NATIONS

The Silver Institute warmly welcomes to membership the following three companies: **Australian Silver Reclamation Pty. Ltd.,** 30 Cross Street, P.O. Box 504, Brookvale 2100, New South Wales, Australia, with its Export Sales Manager, Paul P. Servais, as its Official Representative in Institute affairs; **Compañia Minera de Caylloma, S.A.,** Avenida Jorge Basadre (antes Av. Orrantia) # 410, San Isídro, Lima, 27 Perú, represented in Institute affairs by its Managing Director, Andrés Bravo Bresani; and **Luxmi Traders,** 2, India Exchange Place, Calcutta-700 001, India, with S.G. Daga as its representative in Institute matters. The Silver Institute has members producing silver and silver products in 25 countries.

INTERESTING STERLING SILVER ONE POUND COIN ISSUED BY JERSEY

Jersey has a population of approximately 80,000 and is the largest of the Channel Islands, covering an area of 45 square miles. It lies only a few miles from the northwest coast of France and about 100 miles from England. Because of its proximity to France, the history of Jersey includes many French attacks on it. The last of such attacks culminated in the **Battle of Jersey in 1781**—an event commemorated two hundred years later by the minting of Jersey's new One Pound coin, *shown at right.* Ten thousand sterling silver proof One Pound Coins, measuring 25.4 mm in diameter (from corner to corner) and weighing 10.45 grams, were minted by the Royal Mint. The coin's pictured design shows the badge of the Royal Jersey Militia which—together with Garrison forces—defeated a French attack force under the command of Baron de Rullecour on January 6, 1781. Additional information about this coin may be obtained from the Royal Mint Numismatic Bureau, P.O. Box 6, Llantrisant, Pontyclun, Mid-Glamorgan, CF7 8YT Great Britain or, in the U.S., from the **British Royal Mint,** 128 Passaic Avenue, Fairfield, N.J. 07006.

NEW SILVER DEVELOPMENTS

The January 1981 issue of New Silver Technology describes 70 new silver developments from 13 countries. Among these are the following:

- Improved solid electrolyte batteries which operate effectively at extremes of temperature have been produced:
  —Forschungsinstitut Berghof GmbH of Tübingen, Germany and Instituto de Quimica-Fisica of Madrid, Spain use silver rubidium iodide.
  —Solid State Physics Laboratories of Al Fateh University in Tripoli, Libya make the batteries with silver iodide orthophosphate.
  —Capitol Industries of Montreal, Quebec and Sprague Electric Co. of North Adams, Massachusetts developed silver iodide pyrophosphate for these new batteries.
- Silver-hydrogen storage batteries with maximum power and minimum weight are now made by EIC Corporation of Newton, Massachusetts.
- PPG Industries, Inc. of Pittsburgh, Pennsylvania uses thin transparent layers of silver along with titanium oxide for electrically heated windows to remove frost and ice for automobiles and aircraft.
- Improved contact material for telephone equipment, made with 98.1% silver and 1.9% silicon, has been developed by Ibaraki Electrical Communications Laboratory and Nippon Telegraph and Telephone Public Corporation in Tokyo, Japan.
- Bendix Corporation in Kansas City, Missouri tested 29 kinds of solder and found that two solders made with silver and tin surpassed all the others in resisting cracking under thermal stresses.
- A new electrolytic cell for continuous production of refined silver and refined gold has been developed by Chimet S.p.A. of Arezzo, Italy.

LATEST SILVER INSTITUTE REFINING STATISTICS

Production and Disposition of **999 Silver Bars** by All Known Refiners in the United States

	TROY OUNCES	MILLION TROY OUNCES				
	January 1981	Jan 1981	Dec 1980	Jan 1980	Full Yr 1980	Full Yr 1979
THESE REFINERS' PRODUCTION, BY SOURCE		*MONTHLY RATE*				
From Primary (ores & concentrates)	3,601,102	3.6	4.0	5.6	3.4	4.8
From Coins	345,627	0.3	0.7	3.8	1.4	0.4
From Old Scrap (used photo film & other products)	6,121,985	6.1	6.2	6.6	6.2	5.1
From New Scrap (in-plant clippings, waste)*	2,820,324	2.8	3.6	2.0	2.8	2.3
TOTAL PRODUCTION	12,889,038	12.9	14.6	18.1	13.9	12.6
TOTAL PRODUCTION Less New Scrap*	10,068,714	10.1	10.9	16.0	11.1	10.3
ABOVE TOTAL PRODUCTION, BY OWNERSHIP						
From Refiners' Own or Purchased Materials	9,144,142	9.1	10.7	11.9	9.2	8.9
Refined on Toll for Others	3,744,896	3.7	3.9	6.2	4.7	3.7
DISPOSITION BY THESE REFINERS						
Converted in Plant (consumed in fabricating, etc.)	4,518,082	4.5	5.8	5.1	4.9	3.1
Shipped Out: Own materials	4,208,847	4.2	5.1	4.9	4.5	6.9
Against Tolls	3,620,121	3.6	3.8	6.4	4.5	2.7
TOTAL DISPOSITION	12,347,050	12.3	14.7	16.3	13.9	12.7
TOTAL DISPOSITION Less New Scrap*	9,526,726	9.5	11.1	14.3	11.1	10.4
RESULTING CHANGE OF THESE REFINERS'		*TOTAL FOR PERIOD*				
STOCKS (Production Minus Disposition)	+541,988	+0.5	−0.1	+1.8	−0.5	−1.3
THESE REFINERS' STOCKS AT END OF PERIOD	1,644,013	1.6	1.1	3.3	1.1	1.5

Production and Disposition of **999 Silver Bars** by All Known Refiners in Australia, Canada, Mexico, Peru, South Africa and Sweden; and some other Refiners in Europe and Asia.

	TROY OUNCES	MILLION TROY OUNCES				
	January 1981	Jan 1981	Dec 1980	Jan 1980	Full Yr 1980	Full Yr 1979
THESE REFINERS' PRODUCTION, BY SOURCE		*MONTHLY RATE*				
From Primary (ores & concentrates)	11,690,154	11.7	10.6	13.5	12.0	12.7
From Coins	305,748	0.3	0.2	0.1	0.1	0.0+
From Old Scrap (used photo film & other products)	6,082,534	6.1	6.3	7.7	7.7	4.1
From New Scrap (in-plant clippings, waste)*	1,343,246	1.3	1.4	1.5	1.4	0.8
TOTAL PRODUCTION	19,421,682	19.4	18.6	22.8	21.2	17.6
TOTAL PRODUCTION Less New Scrap*	18,078,436	18.1	17.2	21.2	19.7	16.8
ABOVE TOTAL PRODUCTION, BY OWNERSHIP						
From Refiners' Own or Purchased Materials	16,521,704	16.5	15.0	18.7	17.3	15.2
Refined on Toll for Others	2,899,978	2.9	3.6	4.1	3.9	2.4
DISPOSITION BY THESE REFINERS						
Converted in Plant (consumed in fabricating, etc.)	5,925,287	5.9	5.6	8.4	7.1	4.3
Shipped Out: Own materials	10,895,121	10.9	11.1	11.6	10.4	11.3
Against Tolls	2,665,709	2.7	3.5	2.9	3.4	2.0
TOTAL DISPOSITION	19,486,117	19.5	20.2	23.0	21.0	17.6
TOTAL DISPOSITION Less New Scrap*	18,142,871	18.1	18.8	21.5	19.5	16.8
RESULTING CHANGE OF THESE REFINERS'		*TOTAL FOR PERIOD*				
STOCKS (Production Minus Disposition)	−64,435	−0.1	−1.6	−0.2	+2.3	+0.4
THESE REFINERS' STOCKS AT END OF PERIOD	7,567,586	7.6	7.6	5.1	7.6	5.3

* PRODUCTION From New Scrap is 999 silver made from in-plant clippings, spillage, sweepings, etc., generated during manufacturing processes; since it is in continuous cycle from new scrap to 999 silver, to new scrap, some like to see the production and disposition totals after deducting the new scrap from both.

THE SILVER INSTITUTE

A WORLDWIDE ASSOCIATION OF MINERS, REFINERS, FABRICATORS AND MANUFACTURERS

INCORPORATED 1971

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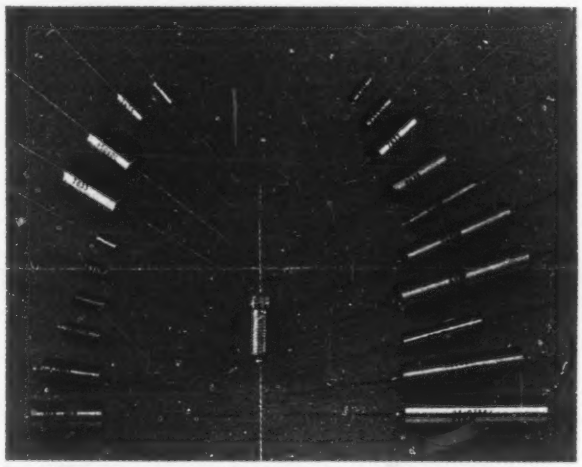
THE SILVER INSTITUTE LETTER

INFORMATION ON SILVER FOR INDUSTRY

VOLUME XI, NUMBER 3 MARCH 1981

NEW SHAPES AND CONCEPTS OF SILVER'S CONDUCTIVITY

"Because of its superior conductive qualities, large quantities of silver have long been used in the manufacture of capacitors, resistors and other electronic components. Initially silver was used in metallic form, either as a solid can or as a solid plate, but," according to Mr. A.M.B. Hart, President of **Johnson Matthey Ltd.**, 110 Industry Street, Toronto, Canada M6M 4MI and Vice President for Canada of The Silver Institute, "the need to reduce the cost and the size of these components, so that many times more of them would be used, meant that our firm had to develop products through which silver could be accurately deposited onto very small areas."



Tantalum capacitors are dipped in silver "paint" because of silver's superior conductive qualities.

"As a result, our Johnson Matthey affiliates in Great Britain and the United States developed products called **'conducting plastics'–pure silver with resins**–which we sell throughout the world. They are manufactured in the form of paints or adhesives which, when applied to a surface or joint, will permit electrons to flow through the metallic particles and thus conduct electricity. As a result, a new concept of creating conductive surfaces has come from the new methods of applying silver's conductive qualities to any surface. Conductivity can now be applied by spraying, brushing, dipping, screen-printing, or even by using a knife or spatula. Similarly, soldering was a traditional technique used for forming metal to metal conductive bonds; now silver conductive adhesives are increasingly used by both industry and the handyman as a new way of 'cold soldering'." said Mr. Hart.

As Mr. Chris Proctor of **Johnson Matthey Chemicals Ltd.**, Orchard Road, Royston, Hertfordshire S68 5HE England, recently commented, "If you had to attach an electrode to a piece of glass, it would be a very brave man who would take out a hot soldering iron and try to achieve this. With silver conductive adhesives, it is now so simple that it can be done at room temperature by the ordinary person, often in his own house. This is where the major breakthrough has taken place. Instead of supplying conductive resins only to highly specialized, highly technical industries, they are now available for the handyman. No special training or equipment is required. If you can use a paint brush or mix two components together with a palette knife or spatula, then you can make conductive surfaces or conductive joints with silver plastic."

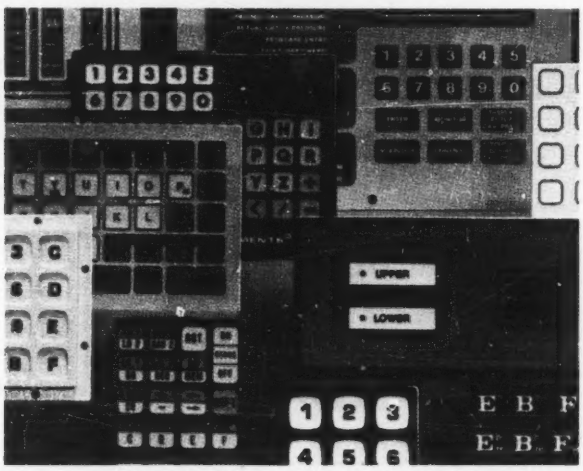
SILVER CIRCUITS FOR EGGS, JEWELERS AND . . . INDUSTRY

The Agricultural Research Council in Great Britain wanted to determine the length of time of incubation of "lots of eggs", and asked Johnson Matthey if it could help. According to Chris Proctor of Johnson Matthey Chemicals Ltd., "The answer was simple. Paint two small circuits with silver resin onto each egg shell and connect these up to timers using silver adhesive to bond the electrodes. As soon as the chick breaks the egg the circuit is broken and it records the exact time. Just imagine how difficult it would have been to do all this with solid metal. The difference is that with a silver resin you can put down the thinnest of films so that the egg itself is not damaged, or interfered with."

Mr. Proctor noted that by painting silver lines around the edge of the glass of a refrigerated food display case, if the glass panel should be broken, the silver painted track–connected to an emergency cut-off switch–would also be broken and would render harmless any exposed and potentially dangerous electrical circuitry. He added, "Of course, the obvious application here is for jewelers and banks. Sometimes you may notice that their windows have a similar alarm system using, for example, a conductive tape bonded onto the glass. This can cause problems because it is possible for the glass to break out but for the conductive tape to remain unbroken. This problem does not occur with a silver paint because it is in intimate contact with the glass."

But, for industry? Mr. Ron Selwood of **Johnson Matthey, Inc.,** Metallizing Preparations, 456 Devon Park Drive, Wayne, Pennsylvania 19087, noted that his company has supplied the tantalum capacitor industry's **Sprague Electric Company** of North Adams, Massachusetts, the **Kemet Division of Union Carbide** in Greenville, South Carolina and others with over 500,000 ounces of Counter Electrode silver "paint" which is applied to capacitors through a dipping process. And other silver conductive plastics are being used by the resistor industry. For example, when you turn your channel selection knob on your Zenith TV set, the selector is riding on a track of silver "paint".

And insofar as silver conductive adhesive, or **Silver Epoxy,** is concerned, it is packaged in syringes for sale to the semi-conductor industry for use in a "dotting" process employed to assure conductive adhesion between a chip and its package. The silver conductive adhesive also acts to drain off heat and excess electricity. The makers of quartz crystal watches also use Silver Epoxy, as do the air and space industries. This use of silver conductive adhesive as a *"cold conductive solder"* is partly explained by the fact that many people would not want to use a soldering iron if the parts to be bonded were inaccessable, or very delicate, or situated near to something which is heat sensitive. For example, who would willingly hot-solder a component back onto a circuitry board which is made of delicate plastic? Or again, glass is now a very fashionable surface upon which to place electronic circuitry. Take for instance, some de-icing screens in motor car windows. If one of the tracks is broken, how will you repair it? A dangerous method with a soldering iron is not appropriate. Some screens can now be simply repaired with conductive paint and a brush. Many silver conductive plastic products are available from the companies listed above, or from: **Technical Wire Products, Inc.,** 129 Dermody Street, Cranford, N.J. 07016; **Chomerics, Inc.,** 77 Dragon Court, Woburn, Massachusetts 01888; **Engelhard Hanovia Thick Film Division,** 1 West Central Ave., East Newark, N.J. 07029; and **Demetron GmbH,** Leipsiger Strasse, 10, 6450 Hanau, West Germany.



Silver membrane touch switches are used in keyboards of modern microcomputers, copiers, organs, spectrum analyzers and industrial controls.

SILVER MEMBRANES TOUCH YOUR FUTURE

When your fingers touch the numbers on a perfectly smooth, buttonless keyboard of one of the newest calculators, you literally have one of the most dramatic growth areas of the conductive plastics market at your fingertips . . . **Membrane touch switches.** These, essentially, are pieces of plastic with a silver paint printed onto them. Already, according to Mr. Proctor, these components are economical primarily because they can be made quickly and reproduced accurately by modern printing techniques.

Mr. Proctor added, "Speed of production is the essence of component manufacture in so many situations today. One new developing range of silver conductive plastics is the type that cures by exposure to ultraviolet light–instantly. It is now possible to deposit very thin controlled films of silver conductive plastic at exceptionally fast speeds and dry them immediately."

Mr. Ron Selwood of Johnson Matthey's Wayne, Pennsylvania organization noted that in

addition to the use by the calculator industry, silver membrane touch switches are also being used in modern elevators and cash registers; however, Mr. Selwood sees the greatest short term growth potential as coming from the automobile industry which is "only a couple of years" away from a knobless dashboard–with all items currently controlled by knobs or pushbottons, changed over to silver membrane touch switch controls. "This change will not only facilitate many new dashboard design improvements, but will tend to increase the efficiency of the affected controls at the same time the new silver switches decrease maintenance needs." said Mr. Selwood.

Already producing silver membrane touch systems are **Rogers Corporation** of Rogers, Connecticut 06263; **Oak Industries Inc.,** 16935 West Bernardo Drive, Rancho Bernardo, California 92718; and **Centralab,** 5757 North Green Bay Avenue, Milwaukee, Wisconsin 53201.

SILVER INSTITUTE WELCOMES NEW MEMBER

The Silver Institute has cordially welcomed to membership **Exxon Minerals Company,** 1251 Avenue of the Americas, New York, N.Y. 10020, with its Manager, Business Environment & Commodity Analysis Division, J.L. Way, as its Official Representative in Institute affairs. Its Alternate Official Representative is J.T. Graham, Manager, Commodity Analysis.

SILVER IMPORTANT AS STORE OF VALUE

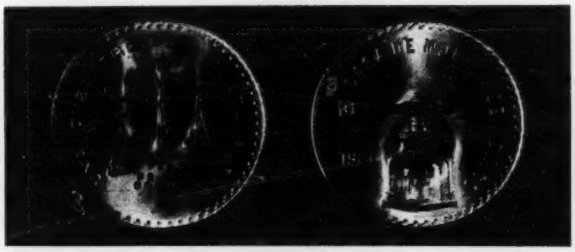
Because many ancient monies were defined by their weight, it is possible to convert their value into 1980 dollar approximations. Using this technique, "The tabernacle built by Moses (Exodus 38: 20–30) cost more than $20,000,000." said Mr. Pierre Gérin-Jean, President of the **Société Minière et Métallurgique de Peñarroya,** Tour Main-Montparnasse, 33, avenue du Main, 75751 Paris Cedex 15, France, during the **American Metal Market's Gold and Silver Forum,** held in New York City in January.

In discussing silver's current role as a store of value, Mr. Gérin-Jean analysed its value as a price for a barrel of oil, and said that this price has not varied very much. He added that expressed in weight of silver, it has oscillated between 1.0 and 2.7 ounces for most of the time during the past decade. Recently, a barrel of oil was equivalent in price to something over two ounces of silver, or what it was worth in the 1950's and, roughly speaking, what it has been worth since 1974.

Mr. Gérin-Jean suggested that in view of silver's long term importance as a store of value, the day may come when some of the larger producer countries of the Americas might again count some silver among their international monetary reserves, and foster large scale international, popular use of silver for savings by minting and actively marketing silver bullion coins similar to the gold Krugerrand, the Canadian Maple Leaf and the Mexican 50-Peso piece.

Although Mexico has not yet actively promoted its silver bullion piece internationally, it has indeed recognized silver's role as a store of value and the need for a piece containing exactly one troy ounce of pure silver. In 1949, Mexico minted one million 925 fine sterling silver "Onza Troy" bullion pieces. With an increasing demand, Mexico issued 4,788,000 in 1978–1979, and in 1980 another 5,056,000 "Onzas" to supply the Mexican and international coin collecting and investment communities. Formerly, in Mexico, only the Banco de México sold them. Today the "Onza Troy" (shown below) is bought and sold daily by all Mexican commercial banks, thus making it a liquid asset as well as a store of value.

In other nations, the "Onza" can be purchased from coin dealers, such as the well known firm of **Almanzar's Coins of the World, Inc.,** Bank of San Antonio Bldg., Suite 208, One Romana Plaza, San Antonio, Texas 78205 and others. Anticipating increased demand for the "Onza Troy", Almanzar's has recently replenished its stock of "Onzas" which are being sold in lots of 1, 2, 10 and 100.



LATEST SILVER INSTITUTE REFINING STATISTICS

Production and Disposition of **999 Silver Bars** by All Known Refiners in the United States

	TROY OUNCES	MILLION TROY OUNCES				
	February 1981	Feb 1981	Jan 1981	Jan-Feb 1981	Jan-Feb 1980	Full Yr 1980
THESE REFINERS' PRODUCTION, BY SOURCE		*MONTHLY RATE*				
From Primary (ores & concentrates)	3,872,733	3.9	3.6	3.7	5.2	3.4
From Coins	372,682	0.4	0.3	0.4	3.3	1.4
From Old Scrap (used photo film & other products)	5,133,537	5.1	6.1	5.6	6.5	6.2
From New Scrap (in-plant clippings, waste)*	2,610,903	2.6	2.8	2.7	2.8	2.8
TOTAL PRODUCTION	11,989,855	12.0	12.9	12.4	17.8	13.9
TOTAL PRODUCTION Less New Scrap*	9,378,952	9.4	10.1	9.7	15.0	11.1
ABOVE TOTAL PRODUCTION, BY OWNERSHIP						
From Refiners' Own or Purchased Materials	8,478,011	8.5	9.1	8.8	12.1	9.2
Refined on Toll for Others	3,511,844	3.5	3.7	3.6	5.8	4.7
DISPOSITION BY THESE REFINERS						
Converted in Plant (consumed in fabricating, etc.)	3,668,965	3.7	4.5	4.1	5.5	4.9
Shipped Out: Own materials	4,087,796	4.1	4.2	4.1	5.4	4.5
Against Tolls	3,503,034	3.5	3.6	3.6	5.6	4.5
TOTAL DISPOSITION	11,259,795	11.3	12.3	11.8	16.6	13.9
TOTAL DISPOSITION Less New Scrap*	8,648,892	8.6	9.5	9.1	13.8	11.1
RESULTING CHANGE OF THESE REFINERS'		*TOTAL FOR PERIOD*				
STOCKS (Production Minus Disposition)	+730,060	+0.7	+0.5	+1.3	+2.4	−0.5
THESE REFINERS' STOCKS AT END OF PERIOD	2,374,073	2.4	1.6	2.4	4.0	1.1

Production and Disposition of **999 Silver Bars** by All Known Refiners in Australia, Canada, Mexico, Peru, South Africa and Sweden; and some other Refiners in Europe and Asia.

	TROY OUNCES	MILLION TROY OUNCES				
	February 1981	Feb 1981	Jan 1981	Jan-Feb 1981	Jan-Feb 1980	Full Yr **1980
THESE REFINERS' PRODUCTION, BY SOURCE		*MONTHLY RATE*				
From Primary (ores & concentrates)	12,232,333	12.2	11.7	12.0	12.9	12.0
From Coins	78,257	0.1	0.3	0.2	0.1	0.1
From Old Scrap (used photo film & other products)	5,385,144	5.4	6.1	5.7	8.3	7.4
From New Scrap (in-plant clippings, waste)*	1,068,399	1.1	1.3	1.2	1.7	1.4
TOTAL PRODUCTION	18,764,133	18.8	19.4	19.1	22.9	21.0
TOTAL PRODUCTION Less New Scrap*	17,695,734	17.7	18.1	17.9	21.3	19.5
ABOVE TOTAL PRODUCTION, BY OWNERSHIP						
From Refiners' Own or Purchased Materials	15,355,139	15.4	16.5	15.9	18.6	17.2
Refined on Toll for Others	3,408,994	3.4	2.9	3.2	4.3	3.8
DISPOSITION BY THESE REFINERS						
Converted in Plant (consumed in fabricating, etc.)	4,982,286	5.0	5.9	5.5	8.6	7.0
Shipped Out: Own materials	11,721,676	11.7	10.9	11.3	11.0	10.4
Against Tolls	3,506,077	3.5	2.7	3.1	3.2	3.3
TOTAL DISPOSITION	20,210,039	20.2	19.5	19.8	22.8	20.8
TOTAL DISPOSITION Less New Scrap*	19,141,640	19.1	18.1	18.6	21.1	19.3
RESULTING CHANGE OF THESE REFINERS'		*TOTAL FOR PERIOD*				
STOCKS (Production Minus Disposition)	−1,445,906	−1.4	−0.1	−1.5	+0.3	+2.3
THESE REFINERS' STOCKS AT END OF PERIOD	6,121,680	6.1	7.6	6.1	5.6	7.6

* PRODUCTION From New Scrap is 999 silver made from in-plant clippings, spillage, sweepings, etc., generated during manufacturing processes; since it is in continuous cycle from new scrap to 999 silver, to new scrap, some like to see the production and disposition totals after deducting the new scrap from both.

** Revised

THE SILVER INSTITUTE

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THE SILVER INSTITUTE LETTER

INFORMATION ON SILVER FOR INDUSTRY

VOLUME XI, NUMBER 4 APRIL 1981

ADDITIONAL LANGUAGE VERSIONS OF "SILVER" MOVIE

Photos by Barbara Moynehan

Above, l. to r.: *Yoshiyuki Shibuya of Nippon Mining Co., Ltd., Hisashi Uchida and Seiichi Ohtsuki of Mitsubishi Metal Corp. with Japanese film "Silver."*

フィルム「金銀」は大変
素ラ晴らしいフィルムです。

Left: *François Guillaumot of Comptoir Lyon-Alemand Louyot.*

After viewing the French language version of the beautiful color sound film **"Silver,"** François Guillaumot of **Comptoir Lyon-Alemand Louyot,** 13, rue de Montmorency, 75139 Paris Cedex 03, France, exclaimed, "C'est un excellent film montrant parfaitement la production et les utilisations de l'argent." Participating in the preparation of Japanese language titles for the Japanese narrated film were Hisashi Uchida and Seiichi Ohtsuki of **Mitsubishi Metal Corp.,** 277 Park Ave., New York, N.Y. 10172 and Yoshiyuki Shibuya of **Nippon Mining Co., Ltd.,** 6 East 43rd Street, New York, N.Y. 10017, whose favorable comment is shown at left. On April 29, each of the five language versions of "Silver" (English, French, German, Japanese and Spanish) will be shown in London, England during a meeting of The Silver Institute. Any of the five language versions of the film may be purchased from The Silver Institute for US $250.

NEW MEMBERS WELCOMED

The Silver Institute cordially welcomes to membership the following companies: **Sociedad Española de Metales Preciosos, S.A.,** Albarracín, 37, Madrid-4, Spain with its Secretary General J. Permuy as its Official Representative in Institute affairs; and **W.C. Heraeus GmbH,** Heraeusstrasse 12-14, Postfach 1553, D-6450 Hanau, Federal Republic of Germany, represented in Institute matters by its Director, Gerhard Mai.

SILVER ALLOY STANDARDS

So that engineers throughout industry can more readily select and specify silver alloys in their products, The Silver Institute promulgates silver alloy standards. In this work it serves as coordinator for the silver industry in the internationally used **SAE-ASTM Unified Numbering System for Metals and Alloys**—as is done by the Aluminum Association, American Iron & Steel Institute, Copper Development Association, and The Gold Institute, for their respective industries.

The Silver Institute Unified Numbering System Committee includes Arnold J. Lincoln of **Engelhard,** David R. Jordan of **Johnson Matthey,** Donald A. Corrigan of **Handy & Harman,** W. A. Schaller of **Degussa,** Michael K. Weiss of **Bunker Hill,** P. Leger of **Comptoir Lyon-Alemand,** and is chaired by Richard L. Davies of The Silver Institute.

Two additional silver alloy standards have now been forwarded for the Unified Numbering System. Sterling silver with a nominal composition of 92.5% silver and 7.5% copper has long been used as an alloy which exhibits beautiful permanence like that of pure silver, but with increased hardness and strength. It is not only the alloy of choice for making elegant silver flatware, holloware and coins, but industrial engineers are finding it ideal for an increasing number of industrial applications, such as

seals and other equipment for safely handling the great volumes of oxygen used in rocket engines, welding, and steel-making. Silver Institute specifications defining two grades of this alloy are shown below.

Silver Institute Specification **SI ST9210** for STERLING SILVER–SILVERSMITHS GRADE		
	Min.	Max.
Silver	92.10%	93.50%
Copper	6.50%	7.90%
Zinc	–	0.06%
Iron	–	0.05%
Cadmium	–	0.05%
Lead	–	0.03%
Other elements	–	0.06%

Silver Institute Specification **SI ST9250** for STERLING SILVER–SILVERSMITHS GRADE		
	Min.	Max.
Silver	92.50%	93.50%
Copper	6.50%	7.50%
Zinc	–	0.06%
Iron	–	0.05%
Cadmium	–	0.05%
Lead	–	0.03%
Other elements	–	0.06%

WEST GERMAN INDUSTRIAL USES OF SILVER

"Silver is being increasingly used in technical products because of its exceptional physical and chemical properties" said Dr. Manfred Poniatowski of **Degussa Hanau,** Postfach 1351, Leipziger Strasse 10, D-6540 Hanau 1, Federal Republic of Germany during a recent Silver Symposium held at the Non Ferrous Metals Information Center in Brussels, Belgium.

Dr. Poniatowski noted that in West Germany, industrial consumption of silver per year has been running at about 40 million troy ounces, "42% supplied by smelting and refining of foreign ores, 2% from German mine production and the rest imported in different forms." Photography consumes about 39% of the silver used, with the electrical and electronics industrial group as second largest consumer at 25%, silverware and jewelry third at 18% followed by soldering and brazing alloys (8%), catalysts (5%) and miscellaneous (5%).

"In Degussa's Hanau plant, for example," Dr. Poniatowski added, **"The two main processing lines for silver are the production of fine silver and silver-copper alloys,** starting with continuous casting and ending with semi-finished products such as sheet, strip, wire, blanks and tubes for anodes, jewelry and silverware and other decorative applications; **and, the production of sintered compound materials,** starting with powder blending, extrusion, and ending with preforms for electrical contacts, or even complete contacts." Fifteen different silver-copper alloys are made by Degussa, and provisions are made for continuous sampling and analysis of each alloy to assure precise uniform composition.

Using silver sheets or strips, Degussa produces blanks for use in the production of coins and medals. He explained, "There are two general qualities: Proof quality with a very smooth surface, giving a mirror effect. The fine silver is rolled with very finely polished rolls, and the work area is maintained as clean and as dust-free as possible; Standard quality, which is generally specified for coins and consists of silver-copper alloys." After the final rolling, the strip is conveyed by an automatic feed unit to a stamping press.

Below. *Silver Institute Vice President Werner Knies of Degussa and Degussa Hanau plant.*

About 10–15% of Germany's industrial consumption of silver is for electrical contacts. Silver is used as an electrical contact material because silver has "the highest electrical and thermal conductivities of any metal and because of its resistance to atmospheric oxidation." Degussa has found that silver containing 10% to 40% nickel is ideal for circuit breakers and disconnect switches. Silver containing 3% to 5% graphite is used for many high performance make-and-break electronic contacts.

PATRIOTS, CHILDREN AND DISABLED PERSONS ON SILVER COINS

Throughout the world, silver coins have been minted through the centuries to honor historic national leaders and patriots. In 1932, on George Washington's 200th birthday, a special commemorative quarter dollar was produced to honor the occasion, and it proved to be so popular that it is still produced today as the design of the currently circulating quarter. In March 1981, Representative D. Douglas Barnard of Georgia introduced a bill in the U.S. House of Representatives which, if passed and signed into law by President Reagan, would **authorize the striking of a minimum of 10 million 90-percent silver commemorative half dollars marking the 250th anniversary of Washington's birth in 1982.**

Mr. Barnard said that his bill calls for "as wide a distribution system as possible" so that anyone who wants to purchase the Washington commemorative coin will get the chance. He added, "They will be legal tender, and will be the same size and weight as the silver half dollars that were produced in this country until 1965." This coin would be sold at a premium which would, according to Representative Barnard, "cover the costs of producing the coin . . . but will be kept as low as possible to insure wide distribution." He noted, "George Washington's administration established our system of coinage, which is so practical that it has been copied by most of the nations of this Earth to some extent. It is only fitting that his 250th birthday be commemorated on a special coin."

But **silver coins have been used to commemorate many other significant events, activities or causes.** One of the most popular recent series of silver coinages was international in nature, and dedicated to **The International Year of the Child (IYC),** sponsored by the UNICEF in an effort to get governments, organizations and individuals throughout the world to reaffirm their concern for the needs of children everywhere. Beautiful silver coins were minted by Bulgaria, Bolivia, Hungary, Philippines, Ethiopia, Maldives, United Arab Emirates, Netherlands Antilles *(shown)* and other nations. Royalties from this program are used by UN agencies and participating governments to benefit needy children worldwide.

And now, silver coins will be issued by as many as 24 countries to commemorate the **International Year of the Disabled Person.** The program is sponsored by the UNICEF and managed by Great Britain's **Royal Mint,** 7 Grosvenor Gardens, London, SW1W OBH England. These silver coins will portray persons of merit or fame who have achieved their positions in spite of disabilities, and "Great Healers" who have improved the conditions of the sick and disabled.

MIGHTY MINIATURE SILVER BATTERIES

A new silver battery weighing only an ounce and a half, can now provide temporary emergency power at one hundredth of a second notice, to maintain the integrity of a computer system while power from other sources is being connected.

The same kind of silver battery can protect air travelers. Hundreds of operations in flying a commercial airplane must be run by electricity. Now, within a second after any power interruption, a little 22 pound silver battery is ready to produce electricity equivalent to 6,700 watts (9 horsepower) continuously for three minutes.

These emergency batteries were developed by Dr. Werner Böhnstedt of **Silberkraft Leichtakkumulatoren, GmbH,** Meidericher Str. 6–8, D-4100 Duisburg 1, West Germany. They are composed of stacks of paper-thin duplex electrodes containing silver, silver oxide and zinc, ready to be instantly activated when contacted by the separately contained electrolyte. The batteries will maintain their readiness for as long as 10 years, and are impervious to both high and low temperature.

This industrial development is one of the 70 summarized in the new April issue of The Silver Institute publication, **New Silver Technology.** The wide range of them includes silver coated molds for continuous casting of steel developed by Nishio Metarijingu K.K. of Kobe Port, Japan. In addition to Germany and Japan, this issue presents summaries of silver developments from Austria, Canada, England, France, India, Israel, Sweden, the United States and Yugoslavia.

LATEST SILVER INSTITUTE REFINING STATISTICS

Production and Disposition of **999 Silver Bars** by All Known Refiners in the United States

	TROY OUNCES	MILLION TROY OUNCES				
	March 1981	Mar 1981	Feb 1981	Jan-Mar 1981	Jan-Mar 1980	Full Yr 1980
THESE REFINERS' PRODUCTION, BY SOURCE		*MONTHLY RATE*				
From Primary (ores & concentrates)	4,621,864	4.6	3.9	4.0	5.0	3.4
From Coins	401,655	0.4	0.4	0.4	2.8	1.4
From Old Scrap (used photo film & other products)	4,804,653	4.8	5.1	5.4	6.7	6.2
From New Scrap (in-plant clippings, waste)*	1,524,223	1.5	2.6	2.3	3.3	2.8
TOTAL PRODUCTION	11,352,395	11.4	12.0	12.1	17.8	13.9
TOTAL PRODUCTION Less New Scrap*	9,828,172	9.8	9.4	9.8	14.4	11.1
ABOVE TOTAL PRODUCTION, BY OWNERSHIP						
From Refiners' Own or Purchased Materials	8,005,011	8.0	8.5	8.5	12.2	9.2
Refined on Toll for Others	3,347,384	3.3	3.5	3.5	5.6	4.7
DISPOSITION BY THESE REFINERS						
Converted in Plant (consumed in fabricating, etc.)	2,630,420	2.6	3.7	3.6	6.0	4.9
Shipped Out: Own materials	5,370,923	5.4	4.1	4.6	5.7	4.5
Against Tolls	2,945,245	2.9	3.5	3.4	5.0	4.5
TOTAL DISPOSITION	10,946,588	10.9	11.3	11.5	16.7	13.9
TOTAL DISPOSITION Less New Scrap*	9,422,365	9.4	8.6	9.2	13.4	11.1
RESULTING CHANGE OF THESE REFINERS'			*TOTAL FOR PERIOD*			
STOCKS (Production Minus Disposition)	+405,807	+0.4	+0.7	+1.7	+3.1	−0.5
THESE REFINERS' STOCKS AT END OF PERIOD	2,779,880	2.8	2.4	2.8	4.7	1.1

Production and Disposition of **999 Silver Bars** by All Known Refiners in Australia, Canada, Mexico, Peru, South Africa and Sweden; and some other Refiners in Europe and Asia.

	TROY OUNCES	MILLION TROY OUNCES				
	March 1981	Mar 1981	Feb 1981	Jan-Mar 1981	Jan-Mar 1980	Full Yr 1980
THESE REFINERS' PRODUCTION, BY SOURCE		*MONTHLY RATE*				
From Primary (ores & concentrates)	12,287,289	12.3	12.2	12.1	12.9	12.0
From Coins	62,463	0.1	0.1	0.1	0.2	0.1
From Old Scrap (used photo film & other products)	7,258,798	7.3	5.4	6.2	8.9	7.4
From New Scrap (in-plant clippings, waste)*	1,370,171	1.4	1.1	1.3	1.7	1.4
TOTAL PRODUCTION	20,978,721	21.0	18.8	19.7	23.8	21.0
TOTAL PRODUCTION Less New Scrap*	19,608,550	19.6	17.7	18.5	22.0	19.5
ABOVE TOTAL PRODUCTION, BY OWNERSHIP						
From Refiners' Own or Purchased Materials	16,804,037	16.8	15.4	16.2	19.3	17.2
Refined on Toll for Others	4,174,684	4.2	3.4	3.5	4.5	3.8
DISPOSITION BY THESE REFINERS						
Converted in Plant (consumed in fabricating, etc.)	5,882,263	5.9	5.0	5.6	9.3	7.0
Shipped Out: Own materials	9,949,013	9.9	11.7	10.9	10.7	10.4
Against Tolls	4,065,087	4.1	3.5	3.4	3.3	3.3
TOTAL DISPOSITION	19,896,363	19.9	20.2	19.9	23.3	20.8
TOTAL DISPOSITION Less New Scrap*	18,526,192	18.5	19.1	18.6	21.6	19.3
RESULTING CHANGE OF THESE REFINERS'			*TOTAL FOR PERIOD*			
STOCKS (Production Minus Disposition)	+1,082,358	+1.1	−1.4	−0.4	+1.4	+2.3
THESE REFINERS' STOCKS AT END OF PERIOD	7,204,038	7.2	6.1	7.2	6.7	7.6

* PRODUCTION From New Scrap is 999 silver made from in-plant clippings, spillage, sweepings, etc., generated during manufacturing processes; since it is in continuous cycle from new scrap to 999 silver, to new scrap, some like to see the production and disposition totals after deducting the new scrap from both.

** Revised

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THE SILVER INSTITUTE LETTER

INFORMATION ON SILVER FOR INDUSTRY

VOLUME XI, NUMBER 5 MAY 1981

REGIONAL MEETINGS IN LONDON

More than a hundred representatives of Silver Institute member companies and guests from 15 countries attended a series of Regional Meetings of The Silver Institute in London, England April 28-30. The meetings were led by Institute Chairman Charles D. Snead, Jr. of Callahan Mining Co., U.S.A.; Institute President Bernhard Rohe of Peñoles, Mexico; and Institute Vice President Werner Knies of Degussa, Germany. These began with a reception on April 28, continuing with a formal banquet at the historic Clothworkers' Guild Hall.

There, the Clothworkers' Co., begun in 1582, maintains a spectacular collection of sterling silver pieces—many the gifts to the Guild by each Master at the end of his service, including Samuel Pepys. A handsome silver piece from the collection graced each dining table at the banquet, and in front of the head table was a collection of modern British sterling silver flatware and holloware.

The Right Honourable Lord Mancroft, past President of the British Institute of Marketing, addressed the dinner, giving descriptions of the importance of British silver historically and today. He also spoke of the outstanding silver coins produced by the Royal Mint for Britain, Venezuela, Afghanistan, Costa Rica, Zambia, Bahamas, Tanzania, Sudan, Pakistan, Botswana and many other countries.

The Clothworkers' Company Beadle, H.A. Cross (extreme right) tells Silver Institute group and the Master of the Clothworkers' Company, Thomas Girtin (extreme left) about the Company, its Hall and its history.

Lord Mancroft shows Mary Rohe, Institute President Bernhard Rohe and Lady Mancroft one of Clothworkers' Hall sterling silver pitchers.

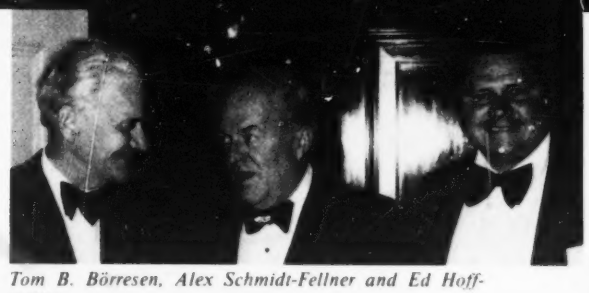
Right, opposite:
George and Lillian Havener, James A. Orser and Jean Louis Danis.

Right, below:
John W. Morgan with Mr. & Mrs. J. L. Davies.

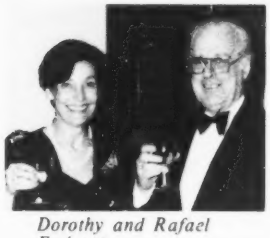
Below:
On the Clothworkers' Hall Reception Landing, Institute Chairman Charles D. Snead, Jr. and his wife, Marron (Ronny), stand beside the 'Golden Ram' which represents the Clothworkers' crest.

Dennis Suskind, Maria B. Hart and A.M.B. Hart.

Kenneth and Carleen Canfield.

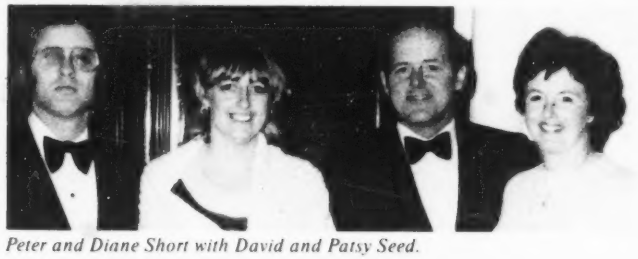


Tom B. Börresen, Alex Schmidt-Fellner and Ed Hoffstatter.



Dorothy and Rafael Errázuriz.

Jeanine and Herbert Coyne.



Peter and Diane Short with David and Patsy Seed.

Ronald and Rosa Gillespie.

Mr. & Mrs. F. F. Wolff, Rudolph Wolff-Noranda hosted a luncheon at the London Metal Exchange.

Kenneth and Betty Barrett, Britannia Refined Metals Ltd., contributed greatly to the success of the Institute's London meetings.

BRITANNIA REFINED METALS MARKS 50TH ANNIVERSARY

On April 29, the representatives of The Silver Institute visited the impressive Northfleet Refinery of member company, Britannia Refined Metals, where they watched tons of unpurified metals come by ship from Mount Isa Mines in Australia and saw it efficiently transformed **(see furnace tapping step shown opposite)** into pure lead, with the silver content produced as pure silver bars, ready for use for sterlingware and a myriad of industrial products. Along with officials of M.I.M. Holdings, ASARCO and other related companies responsible for this great enterprise, The Silver Institute representatives were guests of the company's 50th Anniversary Luncheon.

Upon return to London from Northfleet, members had the opportunity of seeing the English, French, Spanish, German and Japanese versions of the new film SILVER with its depiction of today's widespread use of silver.

REPORTS ON THE SILVER INDUSTRY FROM 14 NATIONS

Institute Chairman Charles D. Snead, Jr. and Institute President Bernhard Rohe.

On April 30, participants in the London Regional Meetings of The Silver Institute convened for a breakfast meeting in the Hilton Hotel. After introductions by Institute Chairman Charles D. Snead, Jr., and Institute President Bernhard Rohe, Werner Knies, Vice President of The Silver Institute for Europe and Africa called on officials of companies from the various countries to report their observations on current developments in the production and use of silver and silver products. Those reporting included Kenneth Barrett of Britannia Refined Metals, Great Britain; Rene Marbot of Entores, France; Tom B Börresen of Boliden, Sweden; Fernand Roux of Métaux Précieux, Switzerland; Gerhard Mai of Heraeus, Germany; Adalbert Prior of Ögussa, Austria; Kazunari Sugimoto of Nippon Mining Co., Japan; H. Llyn Evans of Broken Hill Associated

Institute Vice President Werner Knies led the Breakfast Meeting.

Smelters, Australia; Rafael Errazuriz of Sali Hochschild, Chile; Bernhard Rohe of Peñoles, Mexico; Robert Reininger of Rosario Resources, Honduras; Keith Hendrick of Noranda, Canada; Victor Manuel Beras of Rosario Dominicana, Dominican Republic; and Sohier Marks of Mocatta Metals, USA. Some of those reporting urged that The Silver Insitute increase its activities of technical and market development to assist users and potential users of silver and silver products. These reports from miners, refiners, manufacturers and dealers–producers and users–from various parts of the world, underlined the diversity, the challenges and the resiliency of the industry.

Timothy Roberts of Britannia Refined Metals Ltd., U.K., receives a sterling silver money clip from Peggie Davies of The Silver Institute as a token of the Institute's gratitude for all that he and his wife, Patricia, did to assure the success of the London Regional Meetings.

R. Reininger, Honduras

A. Prior, Austria

H.L. Evans, Australia

S. Marks, U.S.A.

K.C. Hendrick, Canada

K. Sugimoto, Japan

A. Schmidt-Fellner, U.S.A.

F. Roux, Switzerland

V.M. Beras, Dom. Repub.

J.L. Rice, U.S.A.

R. Marbot, France

G. Mai, Germany

D.E.P. Lindh, U.S.A.

and T.B. Börresen, Sweden.

. . . reported on silver and silver products.

INSTITUTE WELCOMES NEW MEMBERS

The Silver Institute warmly welcomes the following new members: **Academy Corporation**, 6905 Washington, N.E., Albuquerque, New Mexico 87109, represented in Institute affairs by its President Keith E. Philippi; **Hallmark Precious Metals, Inc.**, 9725 S.E. 36th Street, Suite 200, Mercer Island, Washington 98040 with its President Marvin E. Senff as Official Representative to the Institute; **Ögussa,** Gumpendorfer Strasse 83-85, Postfach 111, A-1061 Vienna, Austria represented in Institute matters by Dr. Adalbert Prior; and **United States Smelting and Refining, Inc.**, 814 West Haines Street, Plant City, Florida 33566 with President David W. Caldwell as its representative to the Institute.

FASCINATING HISTORICAL PERSPECTIVE ON STORES OF VALUE

The Silver Institute is proud to enclose with this issue of **The Silver Institute Letter**, a copy of the important address on **"Gold and Silver as Stores of Value"**, by Simon D. Strauss (pictured at right) of ASARCO, a founder and the Chairman Emeritus of The Silver Institute.

LATEST SILVER INSTITUTE REFINING STATISTICS

Production and Disposition of **999 Silver Bars** by All Known Refiners in the United States

	TROY OUNCES	MILLION TROY OUNCES				
	April 1981	Apr 1981	Mar 1981	Jan-Apr 1981	Jan-Apr 1980	Full Yr 1980
THESE REFINERS' PRODUCTION, BY SOURCE		*MONTHLY RATE*				
From Primary (ores & concentrates)	3,689,844	3.7	4.6	3.9	4.7	3.4
From Coins	70,130	0.1	0.4	0.3	2.5	1.4
From Old Scrap (used photo film & other products)	5,609,128	5.6	4.8	5.4	•7.3	6.2
From New Scrap (in-plant clippings, waste)*	2,519,822	2.5	1.5	2.4	3.1	2.8
TOTAL PRODUCTION	11,888,924	11.9	11.4	12.0	17.6	13.9
TOTAL PRODUCTION Less New Scrap*	9,369,102	9.4	9.8	9.7	14.5	11.1
ABOVE TOTAL PRODUCTION, BY OWNERSHIP						
From Refiners' Own or Purchased Materials	8,379,687	8.4	8.0	8.5	11.8	9.2
Refined on Toll for Others	3,509,237	3.5	3.3	3.5	5.7	4.7
DISPOSITION BY THESE REFINERS						
Converted in Plant (consumed in fabricating, etc.)	3,603,615	3.6	2.6	3.6	5.9	4.9
Shipped Out: Own materials	4,615,220	4.6	5.4	4.6	6.0	4.5
Against Tolls	3,012,706	3.0	2.9	3.3	5.4	4.5
TOTAL DISPOSITION	11,231,541	11.2	10.9	11.4	17.2	13.9
TOTAL DISPOSITION Less New Scrap*	8,711,719	8.7	9.4	9.1	14.1	11.1
RESULTING CHANGE OF THESE REFINERS' STOCKS (Production Minus Disposition)	+657,383	+0.7	*TOTAL FOR PERIOD* +0.4	+2.3	+1.4	−0.5
THESE REFINERS' STOCKS AT END OF PERIOD	3,437,263	3.4	2.8	3.4	2.9	1.1

Production and Disposition of **999 Silver Bars** by All Known Refiners in Australia, Canada, Mexico, Peru, South Africa and Sweden; and some other Refiners in Europe and Asia.

	TROY OUNCES	MILLION TROY OUNCES				
	April 1981	Apr 1981	Mar 1981	Jan-Apr 1981	Jan-Apr 1980	Full Yr 1980
THESE REFINERS' PRODUCTION, BY SOURCE		*MONTHLY RATE*				
From Primary (ores & concentrates)	13,701,413	13.7	12.3	12.5	12.8	12.0
From Coins	1,706	0.0+	0.1	0.1	0.2	0.1
From Old Scrap (used photo film & other products)	6,384,995	6.4	7.3	6.3	8.6	7.4
From New Scrap (in-plant clippings, waste)*	1,216,518	1.2	1.4	1.2	1.7	1.4
TOTAL PRODUCTION	21,304,632	21.3	21.0	20.1	23.3	21.0
TOTAL PRODUCTION Less New Scrap*	20,088,114	20.1	19.6	18.9	21.6	19.5
ABOVE TOTAL PRODUCTION, BY OWNERSHIP						
From Refiners' Own or Purchased Materials	18,373,365	18.4	16.8	16.8	19.0	17.2
Refined on Toll for Others	2,931,267	2.9	4.2	3.4	4.3	3.8
DISPOSITION BY THESE REFINERS						
Converted in Plant (consumed in fabricating, etc.)	6,128,674	6.1	5.9	5.7	9.0	7.0
Shipped Out: Own materials	10,823,098	10.8	9.9	10.8	10.4	10.4
Against Tolls	2,740,836	2.7	4.1	3.2	3.2	3.3
TOTAL DISPOSITION	19,692,608	19.7	19.9	19.8	22.6	20.8
TOTAL DISPOSITION Less New Scrap*	18,476,090	18.5	18.5	18.6	20.9	19.3
RESULTING CHANGE OF THESE REFINERS' STOCKS (Production Minus Disposition)	+1,612,024	+1.6	*TOTAL FOR PERIOD* +1.1	+1.2	+2.8	+2.3
THESE REFINERS' STOCKS AT END OF PERIOD	8,816,062	8.8	7.2	8.8	8.1	7.6

* PRODUCTION From New Scrap is 999 silver made from in-plant clippings, spillage, sweepings, etc., generated during manufacturing processes; since it is in continuous cycle from new scrap to 999 silver, to new scrap, some like to see the production and disposition totals after deducting the new scrap from both.

THE SILVER INSTITUTE

A WORLDWIDE ASSOCIATION OF MINERS, REFINERS, FABRICATORS AND MANUFACTURERS

INCORPORATED 1971

1001 Connecticut Avenue NW, Washington, D.C. 20036. Tel. (202) 331-1485 and 331-1228

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THE SILVER INSTITUTE LETTER

INFORMATION ON SILVER FOR INDUSTRY

VOLUME XI NUMBER 6 JUNE 1981

WORLD MINES PRODUCED LESS SILVER IN 1980

During the eleventh Annual Meeting of The Silver Institute in the Yale Club of New York City on June 10, members and guests of The Silver Institute received copies of the Institute's **Mine Production of Silver in 1980** which reported world mine production of silver dropped from 345.2 million troy ounces in 1979 to 331.1 million troy ounces in 1980.

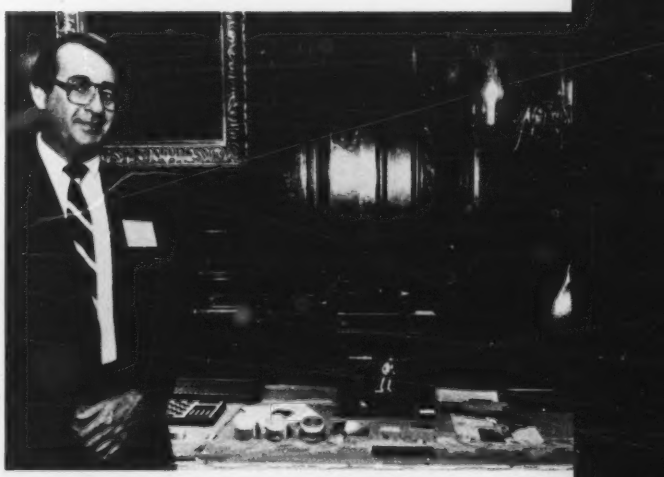
However, the report on **Mine Production of Silver in 1980 with Projections for 1981, 1982, 1983 and 1984,** which was made with the participation of more than 260 mining and related enterprises, with headquarters in 36 countries, projects an increase of 7 percent in global mine production of silver in 1981, to bring total production up to 354 million troy ounces in this calendar year.

This study, which includes the amount of silver produced by each of the 61 countries that are known to mine this precious metal, notes that while 19 countries produced *more* silver in 1980 than in 1979 and 18 countries produced the *same* amount, there were 24 nations that *decreased* their mine production of silver from a total of 243.9 million troy ounces in 1979 to only 223.1 million in 1980. These included six of the largest silver producers in the world: Mexico, Peru, Canada, USA, Australia, and Poland. The United States alone decreased from 38.1 million troy ounces in 1979 to 30.4 million in 1980–a 7.7 million troy ounce decrease! The Soviet Union, with a mine production of 49.9 million troy ounces, had the largest mine production of silver in the world in 1980, as it had in 1979. However, Mexico is now projected to resume the lead position in the current calendar year.

Copies of **Mine Production of Silver–1980 with Projections for 1981, 1982, 1983 and 1984** may be obtained without charge by writing to the Silver Institute.

DISPLAYS OF THE BEAUTY AND UTILITY OF SILVER

The more than 100 persons attending the Annual Meeting of the Silver Institute were treated to a display of a gleaming array of silver ingots, art medals, coin-shaped pieces, medallions and jewelry fashioned by the skilled craftsmen of **The Metal Arts Company,** 230 Park Avenue, New York, N.Y. 10017. Mr. Stanley J. Dahle, Executive Vice President of The Metal Arts Co., noted that several of the beautiful items–including those made for Great American Insurance Co., Xerox, Citicorp, Cartier Jewelers and Tiffany and Co.–were produced to be used as awards in employee, sales and dealer incentive programs.



***Above:** Ron Selwood with Johnson Matthey display of silver conductive coatings and adhesives. **Below:** Stan Dahle with display of Metal Arts Co. silver ingots, medallions and other silver items. **Lower left:** Close-up of new silver "Sunshine" bullion piece by Sunshine Mining and Metal Arts companies.*

Mr. Dahle commented during his brief report, "We are finding that more and more major U.S. corporations are using silver in various forms as sales incentives for recognition and achievements, and as gifts. These silver items are in the form of bullion, jewelry, medallions and collector's plates. This comes as a result of the public's increased interest in and higher perceived value of silver." Metal Arts Company, founded in 1913, and **Sunshine Mining Company** of Dallas, Texas recently announced their intention to form a joint ven-

ture to mint and market 999 fine silver "Sunshine" coin-shaped bullion pieces.

Another display showed samples of Johnson Matthey silver metallizing preparations, and demonstrated their applications. By combining specially processed tiny platelets of pure silver with thermoset resins, microscopically thin layers of silver can be coated on a variety of surfaces with extremely high conductivity at a very low cost. Ronald K. Selwood, Manager, Metallizing Preparations, **Johnson Matthey, Inc.,** Chemical Div., 456 Devon Park Drive, Wayne, Pennsylvania 19087, reported to the Annual Meeting that newer applications of conductive silver coatings and adhesives in membrane touch switches, auto rear window defoggers, solar cells, capacitors, resistors and semiconductors are bringing about "a dramatically increased useage of silver with tomorrow looking even brighter and more exciting for conductive silver coatings than today."

RECENT CHANGES IN SILVER PERFORMANCE

Striking changes have occurred in several aspects of the silver industry in the United States during the recent extremely volatile period, Silver Institute Executive Director, Richard L. Davies reported during the Institute's Annual Meeting. He presented data showing decreases in U.S. mine production, and the dramatic effect of sharp price changes on the production of 999 silver bars from old scrap and on the consumption of 999 silver in industry, as well as the apparent amount of investment in 999 silver.

Mr. Davies also noted, **"Further analyses show a net increase in monthly U.S. consumption of 999 silver in the first quarter of 1981 as compared with 1980.** An average monthly decrease of 383 thousand troy ounces per month for 5 categories of uses, was overbalanced by an average monthly increase of 1,215 thousand troy ounces per month in 8 other categories of use. This resulted in a net increase of 832 thousand troy ounces per month, raising the 1980 average of 10,433,000 troy ounces a month to 11,265,000 troy ounces per month used by U.S. industry in the first quarter of this year. **The 8 use categories registering increases** from full year 1980 to first quarter 1981 in average monthly U.S. consumption of 999 silver were: Contacts, Brazing, Electroplating, Jewelry, Photography, Dental, Catalysts and Miscellaneous uses.

SILVER INSTITUTE ELECTS NEW OFFICERS

During the Annual Meeting of the Silver Institute, the Nominating Committee under the Chairmanship of Robert M. Reininger of Rosario Resources Corporation nominated and the membership elected Bernhard Rohe of Mexico's Industrias Peñoles, S.A. as **Chairman** of the Institute, and Alex Schmidt-Fellner (photo, left) of AMAX Inc. as **President.** Simon D. Strauss of ASARCO was elected **Chairman Emeritus** of the Institute.

The following **Regional Vice Presidents** were also elected: Kenneth R. Barrett of Britannia Refined Metals Limited for Europe and Africa; Kenneth A. Laidman of Engelhard Industries of Canada Limited for Canada; Francis H. Curren of Pease & Curren for Eastern United States; George G. Kent of The Bunker Hill Company for Western United States; Enrique Ibarra of Compañía de Real del Monte y Pachuca for Mexico and Central America; Ernesto Baertl of Minas Arcata S.A. for South America; and Yoshihiro Inai of Mitsubishi Metal Corporation for Australia and Asia.

Front two rows, l. to r.: *Directors attending the Annual Meeting, Karl G. Bergman of AMAX Inc.; Richard D. Mollison of Texasgulf Inc.; Ronald S. Gillespie of Industrial Minera México, S.A.; Alberto Benavides Q. of Cia. de Minas Buenaventura S.A.; Werner Knies of Degussa; Philip M. Lindstrom of Hecla Mining Co.; Keith C. Hendrick of Noranda Sales Corp. Ltd.; Enrique Ibarra I. of Cia. de Real del Monte y Pachuca; Harry M. Conger of Homestake Mining Co.; William P. Lohden of Callahan Mining Corp.; Charles D. Snead, Jr. of Callahan Mining Corp.; Bernhard Rohe of Industrias Peñoles, S.A.; David K. Fagin of Rosario Resources Corp.; A.M.B. Hart of Johnson Matthey Ltd.; Francis H. Curren, Jr. of Pease & Curren; Simon D. Strauss of ASARCO Inc..; Richard L. Davies of The Silver Institute.* ***Back row, l. to r.:*** *John H. Boyd of Kennecott Sales Corp.; C. Michael Boswell of Sunshine Mining Co.; Bob Ross of Engelhard Minerals & Chemicals Corp.; J.A.K. McPhail of INCO Metals Co.; and Robert M. Reininger of Rosario Resources Corp.*

Working in the Annual Meeting.

84 NATIONS ISSUED SILVER COINS IN 1980

In spite of the volatility of silver prices in 1980, 18 countries issued coins in 1980 which did *not* mint silver coins in the previous year. And for at least one country, the People's Republic of China, its 1980 silver coins marking the holding of the Winter Olympic Games in Lake Placid, New York, were the first silver coins ever issued by that nation.

Although mintage figures have not been received from several countries, including 15 countries that traditionally use the British Royal Mint to fulfil their coinage requirements, the data already processed for inclusion in **MODERN SILVER COINAGE—1980** indicate that at least 84 nations minted 243 different silver coinages in 1980.

Of the 84 silver coin issuing nations, 47 countries increased their coinages from the previous year. Among these nations are Belgium, German Democratic Republic, Great Britain, Italy, Mexico, Poland, Sweden, Norway, Venezuela and the USSR. The Isle of Man issued 15 different coinages, making it the producer of the largest variety of different silver coinages in 1980.

Beautiful silver coins were used to commemorate Christmas, the 80th birthday of Queen Elizabeth the Queen Mother, the Olympic Games, the International Year of the Child, and to promote the improvement of the lives of rural women, and to conserve the world's flora and fauna. But, according to **MODERN SILVER COINAGE—1980,** the largest single issue was the Mexican 925 fine sterling silver bullion "coin", called the *"Onza Troy"* because it contains exactly one troy ounce of pure silver. In 1979, Mexico issued 4,508,000 of the "Onzas", but had to increase its mintage to 5,056,000 in 1980 in order to satisfy popular demand for this piece. The second largest coinage was issued by Italy in the form of 1,500,000 silver 500 Lire coins depicting a lady of the Renaissance period on one side and three sailing ships of the same era on the other side.

MODERN SILVER COINAGE—1980 is being prepared with the cooperation of central banks, ministries of finance and mints throughout the world. This unique book includes precise data on the description, weight, dimension, fineness (pure silver percentage), number issued and other information for individual coins issued in 1980. It is available for only $10 per copy, including postage, from The Silver Institute.

NEW INSTITUTE MEMBERS

Warm welcome to membership in The Silver Institute has been extended to **Security Metals Company,** 3208 Colvin Street, Alexandria, Virginia 22314 with President Ellen Hambleton serving as the Official Representative in Institute affairs; to **American Gold & Silver, Inc.** 7524 S.E. Foster Road, Portland, Oregon 97206, represented in Institute affairs by President H. Vance Guffey; and **Philipp Brothers Division** of **Philbro Corporation,** 1221 Avenue of the Americas, New York, New York 10020 represented in the Institute by Raymond Nessim, Group Vice President with John Mihale serving as the Alternate Representative. This brings the Institute's membership to 156 companies in 25 countries.

SILVER ALLOY STANDARDS

For the convenience of industries throughout the world, the SAE-ASTM Unified Numbering System for Metals and Alloys has now assigned official numbers to two Silver Institute designated alloys as shown to the right.

UNS NUMBER P07931
Silver Institute Specification
SI ST9210
for
STERLING SILVER-STANDARD GRADE

	Min.	Max.
Silver	92.10%	93.50%
Copper	6.50%	7.90%
Zinc	–	0.06%
Iron	–	0.05%
Cadmium	–	0.05%
Lead	–	0.03%
Other elements	–	0.06%

UNS NUMBER P07932
Silver Institute Specification
SI-ST9250
for
STERLING SILVER-SILVERSMITHS GRADE

	Min.	Max.
Silver	92.50%	93.50%
Copper	6.50%	7.50%
Zinc	–	0.06%
Iron	–	0.05%
Cadmium	–	0.05%
Lead	–	0.03%
Other elements	–	0.06%

LATEST SILVER INSTITUTE REFINING STATISTICS

Production and Disposition of **999 Silver Bars** by All Known Refiners in the United States

	TROY OUNCES	MILLION TROY OUNCES				
	May 1981	May 1981	Apr 1981	Jan-May 1981	Jan-May 1980	Full Yr 1980
THESE REFINERS' PRODUCTION, BY SOURCE		*MONTHLY RATE*				
From Primary (ores & concentrates)	3,386,998	3.4	3.7	3.8	4.3	3.4
From Coins	0	0.0	0.1	0.2	2.3	1.4
From Old Scrap (used photo film & other products)	4,982,186	5.0	5.6	5.3	7.7	6.2
From New Scrap (in-plant clippings, waste)*	2,032,327	2.0	2.5	2.3	3.0	2.8
TOTAL PRODUCTION	10,401,511	10.4	11.9	11.7	17.4	13.9
TOTAL PRODUCTION Less New Scrap*	8,369,184	8.4	9.4	9.4	14.3	11.1
ABOVE TOTAL PRODUCTION, BY OWNERSHIP						
From Refiners' Own or Purchased Materials	7,527,336	7.5	8.4	8.3	11.2	9.2
Refined on Toll for Others	2,874,175	2.9	3.5	3.4	6.2	4.7
DISPOSITION BY THESE REFINERS						
Converted in Plant (consumed in fabricating, etc.)	2,794,582	2.8	3.6	3.4	5.7	4.9
Shipped Out: Own materials	4,741,306	4.7	4.6	4.6	5.8	4.5
Against Tolls	3,185,771	3.2	3.0	3.3	5.6	4.5
TOTAL DISPOSITION	10,721,659	10.7	11.2	11.3	17.1	13.9
TOTAL DISPOSITION Less New Scrap*	8,689,332	8.7	8.7	9.0	14.1	11.1
RESULTING CHANGE OF THESE REFINERS'			*TOTAL FOR PERIOD*			
STOCKS (Production Minus Disposition)	−320,148	−0.3	+0.7	+2.0	+1.3	−0.5
THESE REFINERS' STOCKS AT END OF PERIOD	3,125,296	3.1	3.4	3.1	2.8	1.1

Production and Disposition of **999 Silver Bars** by All Known Refiners in Australia, Canada, Mexico, Peru, South Africa and Sweden; and some other Refiners in Europe and Asia.

	TROY OUNCES	MILLION TROY OUNCES				
	May 1981	May 1981	Apr 1981	Jan-May 1981	Jan-May 1980	Full Yr 1980
THESE REFINERS' PRODUCTION, BY SOURCE			*MONTHLY RATE*			
From Primary (ores & concentrates)	10,043,940	10.0	13.7	12.0	12.6	12.0
From Coins	19,002	0.0+	0.0+	0.1	0.1	0.1
From Old Scrap (used photo film & other products)	6,037,912	6.0	6.4	6.2	8.7	7.4
From New Scrap (in-plant clippings, waste)*	410,335	0.4	1.2	1.1	1.7	1.4
TOTAL PRODUCTION	16,511,189	16.5	21.3	19.4	23.1	21.0
TOTAL PRODUCTION Less New Scrap*	16,100,854	16.1	20.1	18.3	21.4	19.5
ABOVE TOTAL PRODUCTION, BY OWNERSHIP						
From Refiners' Own or Purchased Materials	13,662,221	13.7	18.4	16.1	18.8	17.2
Refined on Toll for Others	2,848,968	2.8	2.9	3.3	4.3	3.8
DISPOSITION BY THESE REFINERS						
Converted in Plant (consumed in fabricating, etc.)	4,669,637	4.7	6.1	5.5	9.0	7.0
Shipped Out: Own materials	10,479,861	10.5	10.8	10.8	10.4	10.4
Against Tolls	2,876,656	2.9	2.7	3.2	3.3	3.3
TOTAL DISPOSITION	18,026,154	18.0	19.7	19.5	22.6	20.8
TOTAL DISPOSITION Less New Scrap*	17,615,819	17.6	18.5	18.4	20.9	19.3
RESULTING CHANGE OF THESE REFINERS'			*TOTAL FOR PERIOD*			
STOCKS (Production Minus Disposition)	−1,514,965	−1.5	+1.6	−0.3	+2.4	+2.3
THESE REFINERS' STOCKS AT END OF PERIOD	7,301,097	7.3	8.8	7.3	7.7	7.6

* PRODUCTION From New Scrap is 999 silver made from in-plant clippings, spillage, sweepings, etc., generated during manufacturing processes; since it is in continuous cycle from new scrap to 999 silver, to new scrap, some like to see the production and disposition totals after deducting the new scrap from both.

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THE SILVER INSTITUTE LETTER

INFORMATION ON SILVER FOR INDUSTRY

VOLUME XI, NUMBER 7 JULY-AUGUST, 1981

HIGH-PERFORMANCE SILVER-ZINC BATTERIES START AIRPLANES

The requirement for portable high-energy units for starting aircraft in remote areas, particularly in the less developed countries where it is not possible to equip remote airfields with power plants, is being met by conveniently sized silver-zinc batteries manufactured in India. Silver-zinc batteries made by **Simco Meters Limited,** 109 Nungambakkam High Road, Madras 600 034, Tamil Nadu, India, are designed to permit multiple assembly according to power needs.

Each silver-zinc battery *of the type illustrated* has a ten-minute discharge rate of 270 amperes at 1.27 volts. The 30 battery array shown can deliver over 10,000 watts over that period. The rechargeable batteries are fully portable and are internationally used in commercial and military aircraft for starting their engines in remote airfields.

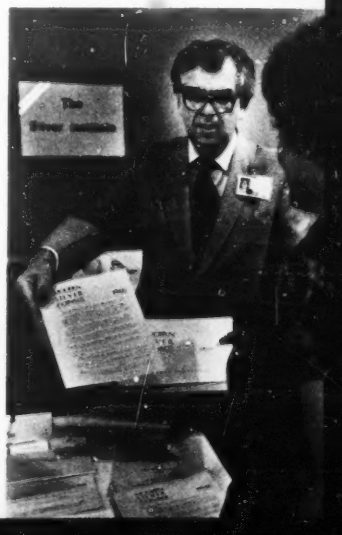
The zinc-silver oxide battery has long been found to be ideal where maximum energy per unit weight and volume of the battery is required. The silver oxide anodes are designed to deliver several full charge-discharge cycles without any appreciable deterioration during the life of the battery. The number of internal electrodes is chosen to meet the maximum current density to be delivered. When the useful life of the battery is spent, the silver oxide anodes designed by Simco may be used in other battery cells before it becomes necessary to reprocess the silver. Simco is also developing lithium-silver batteries. Its battery program is focused on versatility of application and reliability of high-density power supply.

Among the Silver Institute member companies which provide high quality refined silver for batteries and other industrial uses are **Lal Chand Vijay Kumar Jain,** Sarafa Bazaar, Saharanpur and **Luxmi Traders,** 2 Exchange Place, Calcutta, in India.

SILVER INSTITUTE ATTENDS INTERNATIONAL COIN SHOW

This year's 90th Anniversary Convention of the **American Numismatic Association** was truly international in character. Held in the spacious Rivergate Convention Center of New Orleans, Louisiana, July 27 through August 2, an estimated 8,000 coin collectors from many nations visited the Convention's bourse to examine the thousands of ancient and modern coins displayed by some 400 of the world's most prestigious coin dealers.

And for the first time in the history of ANA conventions, coin collectors and dealers were able to better appreciate the beauty and significance of modern coinage by visiting the exhibits of several mints and governments, and the Silver Institute, composed of 156 members that produce silver and silver products in 25 nations. The new and unique book, **Modern Silver Coinage—1980,** was displayed at the Silver Institute booth, managed by David U. Groves (*shown at right*) of the Silver Institute staff. Hundreds of visitors and coin dealers received information about Modern Silver Coinage—1980, the Silver Ingot Mark book, and other publications, as well as copies of Institute newsletters and other reports. **Modern Silver Coinage—1980 is available for only $10 per copy, including postage, from The Silver Institute.**



Coinciding with the July 29 Royal Wedding of His Royal Highness Charles, Prince of Wales, and Lady Diana Spencer, the British Royal Mint's exhibit highlighted coinage struck to honor the wedding. A continuing flow of persons visited this popular exhibit to buy Great Britain's **Royal Wedding Silver Proof Crown**

(*pictured at right*) which is the first ever for a British Royal marriage and was designed by Philip Nathan, a former Mint engraver. Only 250,000 coins were struck as silver proofs for worldwide distribution. With a diameter of 38.61 millimeters and a weight of 28.28 grams, each proof coin was struck from specially polished dies to achieve a mirror-like finish, and relief designs are frosted, to contrast with the polished background. This sterling silver coin features profile portraits of Prince Charles and Lady Diana on the reverse along with a portrait of Queen Elizabeth II on the obverse. Similar .925 silver proof crowns are being issued by Bermuda, Jamaica, Bahamas, St. Helena, Gibralter, Guernsey, Jersey, Tuvalu, Mauritius, Tristan da Cunha, Falkland Islands, Turks and Caicos Islands, Ascencion Islands and Cayman Islands. Additional information about these and other coins, may be obtained from the **British Royal Mint,** 128 Passaic Avenue, Fairfield, N.J. 07006, or from the **Royal Mint,** Numismatic Bureau, Llantrisant, Pontyclun, Mid-Glamorgan, CF7 8YT, Great Britain.

Further stimulating interest in today's coinage and metal arts were the educational and beautiful exhibits of the **Royal Canadian Mint,** 355 River Road, Vanier, Ontario, Canada K1A 0G8 with a marvelous, compact display of the minting process: **The Metal Arts Company,** 230 Park Avenue, New York, N.Y. 10017 showing its artistic and finely crafted medals and 925 fine silver **Sunshine** bullion pieces; the **U.S. Mint** with Director of the Mint, Mrs. Donna Pope, signing autographs and talking with visitors; the **U.S. Bureau of Engraving and Printing;** the **Banco de Mexico;** the **Paris Mint** of France; the **Singapore Mint;** the **Franklin Mint** and the Food and Agriculture Organization **(FAO)** of the United Nations.

One of the many visitors is shown a master sculptured model by (l. to r.) Betsy Baldwin, I.M. Urbach and Catherine Roberts of Metal Arts Co.

Staffing the British Royal Mint's exhibit, (l. to r.): Bett Fernandez, Scott D. Schneider, Kenneth W. Roman, D. Martin Jones and John Van Emden.

NEW MEMBERS WELCOMED

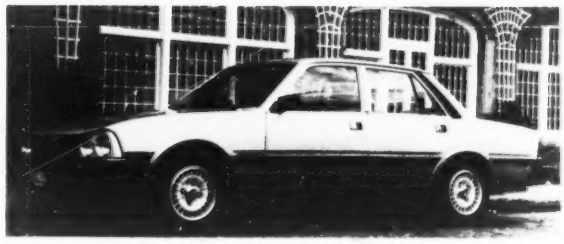
The Silver Institute warmly welcomes to membership **MAPCO Minerals Corporation,** 1667 Cole Boulevard, Building 19, Golden, Colorado 80401 with its Senior Vice President, William C. Cole, serving as the Official Representative in Institute business; **McLemore Metals Inc.,** 507 S. Mobberly Avenue, P.O. Box 3725, Longview, Texas 75606, represented in Institute matters by President B. Reagan McLemore, III; and **Bache Halsey Stuart Metal Co., Inc.,** 100 Gold Street, New York, N.Y. 10038 with Senior Vice President Stanley Steinberg representing the company in Institute affairs.

SILVER TIPPED SPARK PLUGS GO A LONG WAY

Whether accelerating up a steep hill, idling in inner-city traffic, or cruising non-stop for hundreds of miles, motorcycles with engines using the new **Bosch Silver Sport** spark plugs last longer and misfire less; outperforming plugs with copper, nickel or even gold electrodes. The Silver Sport spark plugs are designed to function more efficiently in engines with high rpms.

The secret of the plugs is found in the electrodes which are designed with pure silver tips. Silver's magic is its heat conductivity. No other metal used in spark plug electrodes today can match silver for conducting heat, and this allows the **Robert Bosch Corp.,** 2800 South 25th Avenue, Broadview, Illinois 60153 to shape the silver tip much thinner than tips in standard plugs. When it comes to electrodes, thinner is better. The thinner electrodes let Bosch build a longer insulator with a larger scavenging area. The spark plug is, therefore, less likely to misfire. The thin silver electrodes need

less firing voltage to function, and this slows physical erosion of the silver tip. Silver is also more resistant to chemical corrosion than standard plug materials. The dual benefits of less chemical corrosion and less physical erosion mean a longer lasting spark plug. The Bosch Silver Sport spark plugs are brand new and are recommended for motorcycles, snowmobiles and other engines designed for high rpms.



Bosch spreads silver's magic to the automobile industry as well, with its Automotive Silver spark plug. This innovation hit the European market in 1979, and by 1980 all Peugeot, BMW, Volvo, Audi and Renault models were equipped with the silver tipped plugs. Peugeot recommends that the owners of **Peugeot** cars (*such as the one pictured above*) have a checkup on the spark plugs only every 30,000 miles, which is almost *twice* the recommended duration for their former plugs. The bottom line for the automobile industry is that no spark plug lasts longer and functions more efficiently than plugs with silver tipped electrodes.

NEW SILVER DEVELOPMENTS

The July 1981 quarterly issue of NEW SILVER TECHNOLOGY (annual subscription price $30) shows a steadily increasing development of silver applications. Among these are the following:

• Primary batteries activated by seawater for exploration and life support systems under water have been developed by M. Hiroi, **Kobe University of Mercantile Marine,** Fukae-Minami, Higashinada, Kobe 658, Japan. Batteries made with silver chloride and magnesium metal were found to operate even more efficiently at increased depths where the pressure is over 700 pounds per square inch.

• The superior thermal conductivity of silver is utilized in new super-abrasive grinding wheels developed by R. H. Sioui, Carbide Diamond Products Div., **Norton Company,** 1 New Bond Street, Worcester, Mass. 01606. Because excessive heat causes accelerated wear, silver as a heat dissipater is incorporated with a lubricating resin or graphite to reduce friction. The combination results in improved grinding performance and a considerable reduction in chipping of the edges of the grinding wheel.

• Extremely flexible electrical conductors can be made by applying a metallic silver coating to nylon and other synthetic threads and natural fibers by a process described in U.S. Patent 4,247,596 issued to Tin B. Yee, 719 Erskine St., N.W., Huntsville, Alabama 35805 for the **U.S. Government.** The silver coated fibers can be reliably bonded to terminals with a silver-containing epoxy resin adhesive and withstand even the heavy vibration conditions of spacecraft launch.

• An improved corrosion-resistant silver dental alloy is announced in U.S. Patent 4,234,339, issued to **Engelhard Industries,** 70 Wood Avenue South, Metro Park Plaza, Iselin, N.J. 08830 The new alloy provides both improved corrosion resistance and good handling characteristics, which are a result of particle size control. The silver, tin, and copper alloys are prepared in elliptical, irregular, and flake-like particles which produce an amalgam superior to the conventional alloys using spherical alloy powders.

• A thin flexible laminate of glass, silver, and steel is a desirable solar reflector material developed by R. H. Marion, **Sandia Laboratories,** Albuquerque, New Mexico 87185. Utilizing Flexible Corning Microsheet glass a quarter of a millimeter thick coated with silver and then copper, and bonded to three quarter millimeter thick steel sheet, the laminate resists fracture from sun-induced heat shock. The strength and flexibility of the laminate also withstands hailstones as large as one inch in diameter without damage.

• The antibacterial properties of silver have been incorporated into a new device described in German Patent 2,919,315 issued to **Horst Störk,** 7201 Emmingen-Liptingen 1, West Germany. The device is used to purify ordinary tap water to a quality suitable for use in kidney dialysis machines and other medical and industrial applications where high purity water is required. The active element of the machine is an ion exchanger consisting of silver-containing polymers. This element has a useful life of 6 to 8 years.

LATEST SILVER INSTITUTE REFINING STATISTICS

Production and Disposition of **999 Silver Bars** by All Known Refiners in the United States

	TROY OUNCES	MILLION TROY OUNCES				
	July 1981	Jul 1981	Jun 1981	Jan-Jul 1981	Jan-Jul 1980	Full Yr 1980
THESE REFINERS' PRODUCTION, BY SOURCE		*MONTHLY RATE*				
From Primary (ores & concentrates)	3,677,120	3.7	3.8	3.8	3.8	3.4
From Coins	194,910	0.2	0.0+	0.2	1.9	1.4
From Old Scrap (used photo film & other products)	4,127,092	4.1	5.0	5.1	6.9	6.2
From New Scrap (in-plant clippings, waste)*	2,433,550	2.4	2.6	2.4	2.8	2.8
TOTAL PRODUCTION	10,432,672	10.4	11.5	11.5	15.5	13.9
TOTAL PRODUCTION Less New Scrap*	7,999,122	8.0	8.9	9.1	12.7	11.1
ABOVE TOTAL PRODUCTION, BY OWNERSHIP						
From Refiners' Own or Purchased Materials	8,059,857	8.1	8.7	8.3	9.9	9.2
Refined on Toll for Others	2,372,815	2.4	2.8	3.2	5.5	4.7
DISPOSITION BY THESE REFINERS						
Converted in Plant (consumed in fabricating, etc.)	2,839,551	2.8	3.6	3.4	5.0	4.9
Shipped Out: Own materials	6,436,953	6.4	5.6	5.0	5.3	4.5
Against Tolls	2,333,181	2.3	2.0	2.9	5.2	4.5
TOTAL DISPOSITION	11,609,685	11.6	11.2	11.3	15.5	13.9
TOTAL DISPOSITION Less New Scrap*	9,176,135	9.2	8.5	9.0	12.7	11.1
RESULTING CHANGE OF THESE REFINERS' STOCKS (Production Minus Disposition)	−1,177,013	−1.2	*TOTAL FOR PERIOD* +0.4	+1.2	−0.4	−0.5
THESE REFINERS' STOCKS AT END OF PERIOD	2,300,800	2.3	3.5	2.3	1.2	1.1

Production and Disposition of **999 Silver Bars** by All Known Refiners in Australia, Canada, Mexico, Peru, South Africa and Sweden; and some other Refiners in Europe and Asia.

	TROY OUNCES	MILLION TROY OUNCES				
	July 1981	Jul 1981	Jun 1981	Jan-Jul 1981	Jan-Jul 1980	Full Yr 1980
THESE REFINERS' PRODUCTION, BY SOURCE		*MONTHLY RATE*				
From Primary (ores & concentrates)	12,366,432	12.4	12.1	12.1	12.4	12.0
From Coins	0	0.0	0.0	0.1	0.1	0.1
From Old Scrap (used photo film & other products)	3,280,395	3.3	4.9	5.6	7.9	7.4
From New Scrap (in-plant clippings, waste)*	657,067	0.7	1.0	1.0	1.5	1.4
TOTAL PRODUCTION	16,303,894	16.3	18.0	18.8	21.9	21.0
TOTAL PRODUCTION Less New Scrap*	15,646,827	15.6	17.0	17.8	20.4	19.5
ABOVE TOTAL PRODUCTION, BY OWNERSHIP						
From Refiners' Own or Purchased Materials	14,151,376	14.2	15.0	15.7	17.8	17.2
Refined on Toll for Others	2,152,518	2.2	3.0	3.1	4.0	3.8
DISPOSITION BY THESE REFINERS						
Converted in Plant (consumed in fabricating, etc.)	3,344,451	3.3	4.3	5.0	7.9	7.0
Shipped Out: Own materials	10,478,388	10.5	11.5	10.8	10.4	10.4
Against Tolls	2,150,823	2.2	2.9	3.0	3.3	3.3
TOTAL DISPOSITION	15,973,662	16.0	18.8	18.9	21.6	20.8
TOTAL DISPOSITION Less New Scrap*	15,316,595	15.3	17.8	17.9	20.1	19.3
RESULTING CHANGE OF THESE REFINERS' STOCKS (Production Minus Disposition)	+330,232	+0.3	*TOTAL FOR PERIOD* −0.8	−0.8	+2.1	+2.3
THESE REFINERS' STOCKS AT END OF PERIOD	6,872,145	6.9	6.5	6.9	7.5	7.6

* PRODUCTION From New Scrap is 999 silver made from in-plant clippings, spillage, sweepings, etc., generated during manufacturing processes; since it is in continuous cycle from new scrap to 999 silver, to new scrap, some like to see the production and disposition totals after deducting the new scrap from both.

THE SILVER INSTITUTE

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